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Equations of state of a system of fermions in a uniform magnetic field at finite density[1] ISRAEL PORTILLO VAZQUEZ, EFRAIN J. FERRER, University of Texas at El Paso — The effects of magnetic fields in neutron stars and in quark stars have been studied for many years; however, all these studies did not follow a unique and consistent scheme when finding the field-dependent contributions to the energy density and pressures. Different authors have different stands on what should be the correct field contributions to the pressure and energy. Motivated by this fact, we develop a systematic and self- consistent functional method approach to treat the equation of state of a system of fermions in a uniform magnetic field at finite density and zero temperature. Following our method approach, we find the behavior of the system energy density and pressures, as well as the magnetization, as function of a magnetic field. We present a graphical representation of the field-dependent anisotropic equation of state of the fermion system. Finally, we show that the introduction of the magnetic field results in a pressure anisotropy, which leads to the distinction between longitudinal- and transverse-to-the-field pressures, and we analyze under what conditions this anisotropy becomes significant.

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